

## **Development of a Systematic Approach to Accurately Measure Trace Levels of Volatile Organic Compounds and Semi-Volatile Organic Compounds in Soil and Sediment with High Moisture Content**

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Risk assessment is a crucial component of the site remediation decision-making process. Some current U.S. Environmental Protection Agency (U.S. EPA) methods do not have detection limits low enough for risk assessment of many volatile organic compounds (VOCs) (e.g., U.S. EPA Region 3 Risk-Based Concentration levels, U.S. EPA Region 9 Preliminary Remediation Goals, state-specified concentration levels). The magnitude of this problem was described in a paper recently presented at a University of Massachusetts Remediation Conference with the conclusion that the resolution of this issue is critical for valid human health and ecological risk assessments. Likewise, the difficulty of obtaining complete extraction of water-soluble VOCs and semi-volatile organic compounds (SVOCs) makes the generation of reliable and reproducible data a serious concern in site characterization and risk assessment programs.

This poster presents findings of the development of an analytical method that uses thermal desorption combined with dual gas chromatography/mass spectrometry to extract and accurately measure low levels of VOCs and SVOCs in soil and sediment samples with medium to high moisture content. Thermal extraction was selected for examination because the technique is simpler and more efficient than the present U.S. EPA purge-and-trap methods, and all water-soluble compounds are amenable to the procedure. Efforts were made to modify commonly used instrumentation (e.g., Archon™ autosampler) and quality control compounds (e.g., internal standards, surrogates) in the present U.S. EPA methods so the proposed method can be easily adopted by routine analytical laboratories. This project is a Regional Applied Research Effort involving U.S. EPA Region 1 scientists, U.S. EPA/ORD/NERL/ESD/CMB scientists, and a cooperative research and development agreement with EST Analytical.

The development of a U.S. EPA method capable of accurately measuring trace VOCs, water-soluble VOCs, and SVOCs is important for accurate risk assessment at Superfund, Resource Conservation and Recovery Act, and Brownfields site redevelopment programs, as well as ongoing state site remediation projects.

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